

MAY 02 2007

Attorney Docket No. 044148-4100

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:) Confirmation No. 2417
Kenneth J. Kledzik)
Serial No. 10/648,029) Examiner: Nathan Ha
Filed: August 26, 2003) Group Art Unit: 2814
For: CARRIER BASED ELECTRONIC)
MODULE) Date: May 2, 2007

REPLY TO OFFICE ACTION

MAIL STOP AMENDMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

CERTIFICATE OF FAX TRANSMISSION
I hereby certify that this correspondence is being
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Peaches Thomas
Peaches Thomas

Sir:

In response to the Office Action dated November 2, 2006, please reconsider and withdraw the objections and withdraw the rejections in view of the following remarks.

I. Objection to the Drawings

The Examiner has objected to the drawings as failing to show every feature of the invention specified in the claims. Particularly, the Examiner has objected to the drawings as failing to show the ball-grid array and wherein the ball-grid array of the first and second IC packages are conductively bonded.

Applicant respectfully submits that Figures 29, 30, 35, and 36 show the ball-grid array of the first and second IC packages being conductively bonded. In Figures 29 and 30, as described in the specification in paragraph [0071], "Referring now to FIG. 29, a seventh embodiment electronic module utilizes a sixth embodiment carrier 2901 designed for the mounting of multiple ball-grid array IC packages 2902. Such packages employ pads, rather than leads, to make connection from a semiconductor chip to the external world. This carrier 2901 incorporates butt-I-joint leads 2903, which are solder reflowable for mounting to pads on a

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printed circuit board. Each of the ball-grid array IC packages 2902 has a plurality of connection elements, which in this case are pads, 2904 on each of which a metal (e.g., gold) ball 2905 has been bonded or solder reflow attached. Referring now to FIG. 30, each of the ball-grid array IC packages 2902 has been mounted on the carrier 2901 and each of the balls 2905 is physically and electrically bonded to a corresponding pad 2906 on the carrier 2901. Bonding can be via solder reflow, via vibrational energy input, or any other known technique. The mounting process has created a multiple-package ball-grid array package unit 3001. (emphasis added)”

Applicant submits that these drawings show every feature of the claimed invention, and therefore, requests that this objection be withdrawn.

II. Rejection of Claims 35-36, 38-43, 45-47, 49-51, 54-62, and 64-67 under 35 U.S.C. 103(a)

Claims 35-36, 38-43, 45-47, 49-51, 54-62, and 64-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vakilian (U.S. 6,160,718) and in view of Kim (U.S. 6,069,025). Applicant respectfully traverses.

Independent claims 35, 45, and 57 recite an integrated circuit package wherein the ball-grid array on the integrated circuit package(s) are conductively bonded to the mounting pad array(s).

The Examiner notes that “Vakilian, however, does not expressly disclose using ball-grid array to connect the chip to the carrier. It should be noted that using ball-grid array to provide electrical connections is widely used in semiconductor packaging since the array provides better electrical contacts and in some cases it facilitates the connection process. For instance, Kim, in fig. 6, discloses an analogous package and further teaches using ball-grid array 67 to connect the IC chips 62 to the carrier 61.” The Examiner further states that “it would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the widely available connection method as taught by Kim in order to provide better connections”. Applicant respectfully disagrees.

In Figure 1 of Vakilian, chip 20 is connected to substrate 12 by interconnect bumps 22.

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The chip 20 is located in opening 14 in the substrate 20. Thus, when chip 20 is removed from substrate 12, there is a hole or window through the substrate. See col. 4, lns. 33-65. In the present invention, the IC packages 2902 are mounted by the ball-grid array 2905, which is located in the center area of the carrier 2901. See Figures 29, 30, 35, and 36. Thus, there is nowhere in the substrate 20 of Vakilian to employ a ball-grid array, rather there is a space devoid of material, depriving a ball-grid array of an attachment point. The ball-grid array of Kim cannot be combined with the circuit of Vakilian, as the Examiner has argued. Such a combination would be nonfunctional and is, therefore, nonobvious.

Applicant respectfully submits that Vakilian does not teach each and every feature of claims 35, 45, and 57, particularly, an integrated circuit package wherein the ball-grid array on the integrated circuit package(s) are conductively bonded to the mounting pad array(s). Additionally, because Vakilian cannot physically be combined with Kim, Applicant requests the Examiner withdraw the rejection of claims 35, 45, and 57 as unpatentable over Vakilian and Kim. Because claims 36 and 38-43 depend from claim 35, claims 46-47, 49-51, and 54-56 depend from claim 45, and claims 58-62 and 64-67 depend from claim 57, Applicant requests the Examiner withdraw the rejection of these claims also.

III. Rejection of Claims 37, 44, 48, and 52-53 under 35 U.S.C. 103(a)

Claims 37, 44, 48, and 52-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vakilian and Kim and further in view of Shim (U.S. 6,683,377). Applicant respectfully traverses.

As above, neither Vakilian nor Shim teach each and every feature of independent claims 35 and 45, particularly, an integrated circuit package wherein the ball-grid array on the integrated circuit package(s) are conductively bonded to the mounting pad array(s). Applicant respectfully submits that Shim does not cure the deficiencies of Vakilian and Kim. Because claims 37 and 44 depend from claim 35, and claims 48 and 52-53 depend from claim 45, Applicant requests the Examiner withdraw the rejection of these claims also.